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1 RECORD OF ORAL HEARING
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3 UNITED STATES PATENT AND TRADEMARK OFFICE
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6 BEFORE THE BOARD OF PATENT APPEALS
7 AND INTERFERENCES
8

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10 *Ex Parte* JENNIFER WANG and MIKE BARSKY
11

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13 Appeal 2009-005165
14 Application 10/781,353
15 Technology Center 2800
16

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18 Oral Hearing Held: October 8, 2009
19

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21 Before KENNETH W. HAIRSTON, MARC S. HOFF, and
22 THOMAS S. HAHN, *Administrative Patent Judges.*
23

24 ON BEHALF OF THE APPELLANTS:
25

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31 The above-entitled matter came on for hearing Thursday, October 8,
32 2009, commencing at 9:00 a.m., at the U.S. Patent and Trademark Office,
33 600 Dulany Street, Alexandria, Virginia, before Victor Lindsay, Notary
34 Public.

1 THE USHER: Calendar No. 24, Mr. Thurston.

2 JUDGE HAIRSTON: Good morning, counselor.

3 MR. THURSTON: Good morning to the panel.

4 JUDGE HAIRSTON: Do you have a business card or --

5 MR. THURSTON: I do.

6 JUDGE HAIRSTON: Okay, so we won't misspell your name for the
7 record. We have guests from the European Patent Officer, they're going to
8 listen in today.

9 MR. THURSTON: Oh, I see. Welcome.

10 JUDGE HAIRSTON: You may begin.

11 MR. THURSTON: All right. Well, good morning to the panel.

12 Thank you for hearing this appeal. I'd like to start by narrowing the issue
13 somewhat by canceling Claim 21, and I'll speak to the remainder of the
14 claims.

15 JUDGE HAIRSTON: Well, we can't cancel here, but it will be in the
16 record that you want to cancel Claim 21.

17 MR. THURSTON: Okay, all right. The issue on appeal is whether
18 the prior art cited in the rejections of the remaining claims disclose all the
19 features contained in the remaining claims. Obviously, on behalf of the
20 Applicant, we contend that the prior art does not. Before I get to the prior
21 art, I want to talk about the claims that are at issue. Claims 22 through 27
22 pertain to a semiconductor device having a via that extends through a
23 polymer layer down to the substrate. The via is defined by three
24 fundamental features. First, it's scale; it's submicron with a via opening;
25 second, the aspect ratio which is greater than 1 meaning that in addition to
26 being a very narrow via, it is relatively deep, the depth being in excess of the

1 width. And finally, and most importantly with respect to the prior art, the
2 profile of the via has a hybrid geometry, that is, for most of the profile we
3 have vertical walls extending down to the substrate. However, at the
4 opening of the via, there is, depending upon your perspective, either a taper
5 or a flare, meaning that the via is wider at the mouth than it is at the base.

6 Now, the importance of this hybrid geometry is that it solves two
7 competing concerns. First, with any microchip device, compactness and
8 accuracy is a primary concern. The base of the via solves that concern by
9 being very narrow and having those vertical walls which allow for accurate
10 drawing down through the polymer layer to the substrate. At the same time,
11 the manufacturing process of semiconductor chips has inherent error and
12 inaccuracy. The top portion of the via contains the solution to that problem,
13 that taper giving a slightly larger target for the filling process and allowing
14 the metal to proceed down into the via like a funnel. And then the third
15 benefit of this profile for the via is that it -- what's the word I'm looking
16 for -- it, it keeps as much of the polymer layer as possible, and, and in doing
17 that maintains structural integrity between adjacent vias. So -- am I allowed
18 to present any visual aides to compare the prior art to the --

19 JUDGE HAIRSTON: You mean you have a paper handout?

20 MR. THURSTON: I do, I do.

21 JUDGE HAIRSTON: Yes, you can present it.

22 MR. THURSTON: Okay.

23 JUDGE HAIRSTON: Is this in the record?

24 MR. THURSTON: Is it in the record? It's a summary of my
25 arguments with diagrams from the prior art and the diagrams that are part of
26 the patent, no new matter.

1 JUDGE HAIRSTON: That's fine, you can present it.

2 MR. THURSTON: Okay. I have three sets of two diagrams. So first
3 we have the diagram from the Applicant's Application, that's the Wang
4 document which shows the profile of the via, and I should note that the
5 actual Application goes on at some length with its enabling disclosure as to
6 how to create this via on this scale. The second handout I've given you is
7 the prior art which I refer to as the Lin-369 Patent cited by the Examiner in
8 its -- in the Rejections based on 102 and 103.

9 JUDGE HAIRSTON: Counselor, tell me again why you want a
10 tapered via? Most people want a straight up and down via because you eat
11 up space when you taper like this.

12 MR. THURSTON: Correct.

13 JUDGE HAIRSTON: So why, again?

14 MR. THURSTON: At this scale during the manufacturing process,
15 you have a submicron via actually putting the metal into that via. There can
16 be some air in the delivery system getting that metal into the via, so the idea
17 is to create --

18 JUDGE HAIRSTON: With the walls straight up and down?

19 MR. THURSTON: Right -- to create just a little bit wider opening
20 because the actual --

21 JUDGE HAIRSTON: So you're willing to sacrifice space --

22 MR. THURSTON: Correct, at the mouth.

23 JUDGE HAIRSTON: Okay, okay.

24 MR. THURSTON: And I should say our Specification discloses that
25 the mouth is the 1 micron, so the actual base of the via is submicron so we're
26 dealing with very small scales. In the Rejection, we have the Lin-369 Patent

1 and the Claim Rejections point to Figure 10 of Lin standing for the
2 proposition that Lin discloses a, a tapered via. There are two responses to
3 this. First, if we look at Figure 10, it's not clear to me whether this diagram
4 intends a tapered via or whether it's just some casual draftsmanship.

5 JUDGE HAIRSTON: But it is tapered?

6 MR. THURSTON: Correct. So, assuming that we take that drawing
7 and say that it is -- does, in fact, represent a tapered via, if we look to the
8 body of the 369 Patent, there is not enabling disclosure discussing how to
9 create a tapered via, whether a tapered via is intended by that Patent, and -- I
10 mean when it comes down to it, we're not whittling in balsa wood, we're
11 trying to create a structure at a very small scale through a polymer. And if
12 we're going to say that the Lin-369 Patent is a teaching that constitutes prior
13 art, there needs to be some enabling disclosure teaching how to create that
14 via or there needs to be something in the record --

15 JUDGE HAIRSTON: But there's nothing in 369 that says it's straight
16 up and down -- it has to be straight up and down, right?

17 MR. THURSTON: There's -- all it talks about is conventional
18 methods for creating the via. There's no discussion of the geometry at all.

19 JUDGE HAHN: Counsel, we did not find in the record any evidence
20 that you've submitted on this with respect to what a person of ordinary skill
21 would know as to making such vias with or without tapers. Is there anything
22 in the record that you would rely on as evidence other than attorney
23 arguments?

24 MR. THURSTON: I guess in response to that I would say our
25 evidence is our Specification disclosure teaches how to, through a three-step
26 etching process, create this kind of tapered via. And in the Rejection, we

1 don't see any evidence in the record disclosing how a person of skill in the
2 art would look at Lin-369 and know how to create a via with the hybrid
3 geometry that we have disclosed.

4 JUDGE HAIRSTON: You may continue.

5 MR. THURSTON: Okay. I guess that that is the gist of our argument
6 that there is no -- in the prior art that's been cited against us, there is no
7 teaching as to how to create the via that we've disclosed and taught in our
8 Specification. There's merely this Lin-369 diagram that, for purposes I
9 guess of this hearing, we're saying discloses a tapered via, but, but there is
10 no teaching about how to create that at this scale.

11 JUDGE HAIRSTON: Is that it?

12 MR. THURSTON: That is, indeed.

13 JUDGE HAIRSTON: Okay, any questions?

14 JUDGE HAHN: No, sir.

15 JUDGE HOFF: I have no questions.

16 JUDGE HAIRSTON: Thank you.

17 (Whereupon, the proceedings were concluded.)